receiving water."[1] If effluent limits are found to be needed, the limits are calculated to enforce the ECA considering effluent variability and the probability basis of the limit.

2. CHECK. U.S. EPA's simple mass balance equation[2] is used to evaluate if discharge at the computed ECA is protective. Resultant downstream metal concentrations are compared with downstream calculated CTR criteria under reasonable worst-case ambient conditions.
3. ADAPT. If step 2 results in:

   (A) receiving water metal concentration that complies with CTR criteria under reasonable worst-case ambient conditions, then the hardness value is selected.

   (B) receiving water metal concentration greater than CTR criteria, then return to bullet 1, selecting a lower ambient hardness value.

The CTR's hardness dependent metals criteria equations contain metal-specific constants, so the criteria vary depending on the metal. Therefore, steps 1 through 3 must be repeated separately for each metal until ambient hardness values are determined that will result in criteria and effluent limitations that comply with the CTR and protect beneficial uses for all metals.

Results of Iterative Analysis

The above iterative analysis for each CTR hardness-dependent metal will be used to select ambient hardness values. Using these hardness values to calculate criteria, which are actual ambient sample, will result in effluent limitations that are protective under all ambient flow conditions. The ambient hardness values selected using the three-step iterative process results in protective effluent limitations that achieve CTR criteria under all flow conditions.

This General Order includes effluent limitations for copper, lead, and zinc which are dependent on water hardness. The CTR expresses the criteria for these metals through equations where the hardness of the receiving water is a variable. To simplify the permitting process for this General Order, it was necessary that fixed hardness values be used in these equations.

Using the hardness values determined as described above, the Central Valley Water Board will determine the effluent limitations applicable to each Discharger from the appropriate table of limits (see Tables 7A through 9F) of this General Order. Tables 7A through 9F contain effluent limitations for copper, lead, and zinc with ranges of hardness between 0 mg/L and 400 mg/L.

3. **Determining the Need for WQBEL's**

Effluent limitations must be established for discharges that have the reasonable potential to exceed water quality standards. Since this is a General Order for municipal wastewater treatment facilities, the Central Valley Water Board evaluated the pollutants with applicable effluent limitations in individual NPDES permits for Dischargers that are potentially eligible for coverage under this General Order in order to identify the parameters of concern in these discharges. This General Order includes effluent limitations for the parameters of concern identified through this analysis. Screening levels are established in Attachment C of this General Order for all priority pollutants and other

[1] U.S. EPA Technical Support Document for Water Quality-based Toxics Control (TSD), pg. 96.
[2] U.S. EPA NPDES Permit Writers' Handbook (EPA 833-K-10-001 September 2010, pg. 6-24)

constituents of concern based on the most protective water quality objectives/criteria. Upon receipt of a Notice of Intent for coverage under this General Order, the Central Valley Water Board will conduct an RPA for the discharge using the effluent and ambient background data as discussed in section V.C.2.b of this Fact Sheet, the screening levels in Attachment C, and the RPA procedures discussed below. Based on the results of the RPA, the Notice of Applicability will specify the effluent limitations applicable to a specific Discharger.

a. Priority Pollutants

Attachment C includes screening levels for all priority pollutants. For waters with the MUN use, the screening levels are based on the most stringent of the CTR criteria for protection of human health for waters from which both water and organisms are consumed, CTR criteria for protection of aquatic life, and MCL's. For waters without the MUN use, the screening levels are based on the most stringent of the CTR criteria for protection of human health for waters from which organisms only are consumed and the CTR criteria for protection of aquatic life.

Several priority pollutants do not have applicable CTR criteria or MCL's. Water quality limits have been developed that could be used to interpret narrative Basin Plan objectives for several of these pollutants, including chloroethane, methyl chloride, 2-nitrophenol, 4-nitrophenol, 3-methyl-4-chlorophenol, 4-bromophenyl phenyl ether, 2,6-dinitrotoluene, naphthalene, and delta-BHC. However, analysis of dilution, proximity of downstream diversions, and other factors is required in order to determine the applicability of interpreting the narrative objective for these pollutants based on water quality limits. This type of analysis is beyond the scope of this General Order. In addition to these pollutants, several priority pollutants have no CTR criteria, MCL's, or alternative water quality limits to interpret narrative Basin Plan objectives. These pollutants include 2-chloroethylvinyl ether, acenaphthylene, benzo(ghi)perylene, bis(2-chloroethoxy)methane, 4-chlorophenyl phenyl ether, di-n-octyl phthalate, and pheneanthrene. If detectable concentrations of these pollutants are present in the discharge, additional effluent and ambient receiving water monitoring may be established, as specified in the Notice of Applicability from the Executive Officer. The additional monitoring would be used to determine if the discharge is adversely impacting a beneficial use (i.e., violating the receiving water limitation in section VI.A.4 of this General Order). If the discharge is found to be adversely affecting beneficial uses, the Central Valley Water Board would take the appropriate enforcement actions, terminate coverage for the discharge under this General Order, and/or take other actions to resolve the violation.

To conduct the RPA for priority pollutants, the Central Valley Water Board will use the effluent and ambient background data as discussed in section V.C.2.b of this Fact Sheet, the screening levels in Attachment C, and the procedures specified in section 1.3 of the SIP.

Based on the evaluation of pollutants with applicable effluent limitations in individual NPDES permits for Dischargers that are potentially eligible for coverage under this General Order, the Central Valley Water Board has identified the following priority pollutants of concern that are currently in discharges from municipal wastewater treatment plants: arsenic, bis (2-ethylhexyl) phthalate, chlorodibromomethane, copper, cyanide, dichlorobromomethane, lead, tetrachloroethylene, and zinc. This General Order includes effluent limitations for these priority pollutants of concern. Based on the RPA results for a specific Discharger, the Notice of Applicability will specify effluent limitations for those priority pollutants present in the discharge at

concentrations that exhibit reasonable potential to cause or contribute to an exceedance of water quality objectives/criteria. The applicable water quality objectives/criteria for the priority pollutants of concern in discharges from municipal wastewater treatment plants are as follows:

i. **Arsenic.** The CTR includes maximum 1-hour average and 4-day average criteria of 340 µg/L and 150 µg/L, respectively, for total recoverable arsenic for the protection of freshwater aquatic life, which is applicable for all water bodies. DDW has adopted a Primary MCL for arsenic of 10 µg/L, which is applicable for waters with the MUN use through the Basin Plans' chemical constituent objective.

   Table III-1 of the Basin Plan for the Sacramento and San Joaquin River Basins includes a site-specific objective of 10 µg/L for dissolved arsenic in the Sacramento-San Joaquin Delta. Using the default U.S. EPA acute translator of 1, the objective is 10 µg/L as total recoverable. The Central Valley Water Board has identified the following Dischargers located in the Sacramento-San Joaquin Delta as being potentially eligible for coverage under this General Order: City of Lodi, White Slough Water Pollution Control Facility; and City of Manteca and Dutra Farms, Inc., Wastewater Quality Control Facility. This General Order includes a screening level in Attachment C and effluent limitations in section V.A.1.b.iv of this General Order for total recoverable arsenic based on the site-specific objective, which are applicable to discharges within the Sacramento-San Joaquin Delta.

ii. **Bis (2-ethylhexyl) Phthalate.** The CTR includes a criterion of 1.8 µg/L for bis (2-ethylhexyl) phthalate for the protection of human health for waters from which both water and organisms are consumed, which is applicable for waters with the MUN use. The CTR includes a criterion of 5.9 µg/L for bis (2-ethylhexyl) phthalate for the protection of human health for waters from which organisms only are consumed, which is applicable for waters without the MUN use. DDW has adopted a Primary MCL for bis (2-ethylhexyl) phthalate of 4 µg/L, which is applicable for waters with the MUN use through the Basin Plans' chemical constituent objective.

   Bis (2-ethylhexyl) phthalate is a common contaminant of sample containers, sampling apparatus, an analytical equipment, and sources of detected bis (2-ethylhexyl) phthalate may be from plastics used for sampling or analytical equipment. In conducting the RPA for bis (2-ethylhexyl) phthalate, the Central Valley Water Board will not utilize data that are known to be the result of sample contamination issues (e.g., where the laboratory report shows that the pollutant was detected in the method blank or where the Discharger documents a known source of the pollutant in the sample, such as plastic tubing in composite samplers). Where required, Dischargers shall conduct monitoring for bis (2-ethylhexyl) phthalate using clean sampling techniques to assure that sample containers, sampling apparatus, and analytical equipment are not sources of the detected contaminant.

iii. **Chlorodibromomethane.** The CTR includes a criterion of 0.41 µg/L for chlorodibromomethane for the protection of human health for waters from which both water and organisms are consumed, which is applicable for waters with the MUN use. The CTR includes a criterion of 34 µg/L for chlorodibromomethane for the protection of human health for waters from which organisms only are consumed, which is applicable for waters without the MUN use.

iv. **Copper.** The CTR includes hardness-dependent criteria for the protection of freshwater aquatic life for copper. Attachment C includes screening levels for copper based on the CTR aquatic life criteria for multiple increments of hardness between 0 mg/L and 400 mg/L. The Central Valley Water Board will determine the hardness to be used to select the appropriate screening level in accordance with the approach detailed in section V.C.2.e of this Fact Sheet. If the discharge exhibits reasonable potential to cause or contribute to an exceedance of water quality objectives/criteria for copper, the same hardness will be used to determine the appropriate effluent limitations for copper from section V.A.1.b.iii of this General Order, which shall be specified in the Notice of Applicability.

The CTR aquatic life criteria for copper are presented in dissolved concentrations, as 1-hour acute criteria and 4-day chronic criteria. As discussed in section V.C.2.d of this Fact Sheet, U.S. EPA recommends conversion factors to translate dissolved concentrations to total concentrations. In the absence of site-specific translators, the default U.S. EPA translators were used to calculate the screening levels and effluent limitations for copper. For the City of Grass Valley, Wastewater Treatment Plant, this General Order allows for the acute and chronic CTR criteria and associated effluent limitations (if necessary) for copper to be calculated using site-specific translators. If a Discharger performs studies to determine a site-specific translator, this General Order may be reopened to allow effluent limitations to be modified for that Discharger.

The CTR aquatic life criteria are also expressed as a function of the water effect ratio (WER). In the absence of a site-specific WER, a default WER of 1 was used to calculate the screening levels and effluent limitations for copper. The Central Valley Water Board has approved site-specific WER's in the individual NPDES permits for the following Dischargers (see Table F-4). Consistent with the individual NPDES permits, this General Order allows for the CTR criteria and associated effluent limitations (if necessary) for copper to be calculated using using the site-specific WER's for these Dischargers. If a Discharger performs studies to determine a site-specific WER, this General Order may be reopened to allow effluent limitations to be modified for that Discharger.

Table F-4. Site-Specific Water Effect Ratios for Copper and Zinc

Discharger	Individual Order / NPDES No.	Site-Specific WER Copper	Site-Specific WER Zinc
City of Auburn, Wastewater Treatment Plant	R5-2016-0038 / CA0077712	3.52	--
Donner Summit Public Utility District, Wastewater Treatment Plant	R5-2015-0068 / CA0081621	2.72	--
City of Galt, Wastewater Treatment Plant and Reclamation Facility	R5-2015-0123 / CA0081434	15	--
City of Grass Valley, Wastewater Treatment Plant	R5-2016-0012 / CA0079898	6.49	1.70
Cutler-Orosi Joint Powers Wastewater Authority, Wastewater Treatment Facility	R5-2013-0047-01 / CA0081485	3.1	--
El Dorado Irrigation District, Deer Creek Wastewater Treatment Plant	R5-2014-0081 / CA0078662	9.7	1.7
El Dorado Irrigation District, El Dorado Hills Wastewater Treatment Plant	R5-2013-0003 / CA0078671	8.05	--

Discharger	Individual Order / NPDES No.	Site-Specific WER Copper	Site-Specific WER Zinc
United Auburn Indian Community, Thunder Valley Wastewater Treatment Plant	R5-2015-0077 / CA0084697	24.5	--
United States Department of the Interior, National Park Service, Yosemite National Park, El Portal Wastewater Treatment Facility	R5-2014-0068 / CA0081759	2.0	--

The CTR includes a criterion of 1,300 µg/L for copper for the protection of human health for waters from which both water and organisms are consumed, which is applicable for waters with the MUN use. DDW has adopted a Secondary MCL for copper of 1,000 µg/L, which is applicable for waters with the MUN use through the Basin Plans' chemical constituent objective.

Table III-1 of the Basin Plan for the Sacramento and San Joaquin River Basins includes a site-specific objective of 10 µg/L for dissolved copper in the Sacramento-San Joaquin Delta. Using the default U.S. EPA acute translator of 0.96, the objective is 10.4 µg/L as total recoverable. The Central Valley Water Board has identified the following Dischargers located in the Sacramento-San Joaquin Delta as being potentially eligible for coverage under this General Order: City of Lodi, White Slough Water Pollution Control Facility; and City of Manteca and Dutra Farms, Inc., Wastewater Quality Control Facility. This General Order includes a screening level in Attachment C and effluent limitations in section V.A.1.b.iv of this General Order for total recoverable copper based on the site-specific objective, which are applicable to discharges within the Sacramento-San Joaquin Delta.

v. **Cyanide.** The CTR includes maximum 1-hour average and 4-day average criteria of 22 µg/L and 5.2 µg/L, respectively, for cyanide for the protection of freshwater aquatic life, which is applicable for all water bodies. The CTR includes a criterion of 700 µg/L for cyanide for the protection of human health for waters from which both water and organisms are consumed, which is applicable for waters with the MUN use. The CTR includes a criterion of 220,000 µg/L for cyanide for the protection of human health for waters from which organisms only are consumed, which is applicable for waters without the MUN use. DDW has adopted a Primary MCL for cyanide of 150 µg/L, which is applicable for waters with the MUN use through the Basin Plans' chemical constituent objective.

Table III-1 of the Basin Plan for the Sacramento and San Joaquin River Basins includes a site-specific objective of 10 µg/L for cyanide in the Sacramento-San Joaquin Delta. The Central Valley Water Board has identified the following Dischargers located in the Sacramento-San Joaquin Delta as being potentially eligible for coverage under this General Order: City of Lodi, White Slough Water Pollution Control Facility; and City of Manteca and Dutra Farms, Inc., Wastewater Quality Control Facility. This General Order includes a screening level in Attachment C and effluent limitations in section V.A.1.b.iv of this General Order for cyanide based on the site-specific objective, which are applicable to discharges within the Sacramento-San Joaquin Delta.

vi. **Dichlorobromomethane.** The CTR includes a criterion of 0.56 µg/L for dichlorobromomethane for the protection of human health for waters from which both water and organisms are consumed, which is applicable for waters with the

MUN use. The CTR includes a criterion of 46 µg/L for dichlorobromomethane for the protection of human health for waters from which organisms only are consumed, which is applicable for waters without the MUN use.

vii. **Lead.** The CTR includes hardness-dependent criteria for the protection of freshwater aquatic life for lead. Attachment C includes screening levels for lead based on the CTR aquatic life criteria for multiple increments of hardness between 0 mg/L and 400 mg/L. The Central Valley Water Board will determine the hardness to be used to select the appropriate screening level in accordance with the approach detailed in section V.C.2.e of this Fact Sheet. If the discharge exhibits reasonable potential to cause or contribute to an exceedance of water quality objectives/criteria for lead, the same hardness will be used to determine the appropriate effluent limitations for lead from section V.A.1.b.iii of this General Order, which shall be specified in the Notice of Applicability.

The CTR aquatic life criteria for lead are presented in dissolved concentrations, as 1-hour acute criteria and 4-day chronic criteria. As discussed in section V.C.2.d of this Fact Sheet, U.S. EPA recommends conversion factors to translate dissolved concentrations to total concentrations. In the absence of site-specific translators, the default U.S. EPA translators were used to calculate the screening levels and effluent limitations for lead. If a Discharger performs studies to determine a site-specific translator, this General Order may be reopened to allow effluent limitations to be modified for that Discharger.

The CTR aquatic life criteria are also expressed as a function of the WER. In the absence of a site-specific WER, a default WER of 1 was used to calculate the screening levels and effluent limitations for lead. If a Discharger performs studies to determine a site-specific WER, this General Order may be reopened to allow effluent limitations to be modified for that Discharger.

DDW has adopted a Primary MCL for lead of 15 µg/L, which is applicable for waters with the MUN use through the Basin Plans' chemical constituent objective.

viii. **Tetrachloroethylene.** The CTR includes a criterion of 0.8 µg/L for tetrachloroethylene for the protection of human health for waters from which both water and organisms are consumed, which is applicable for waters with the MUN use. The CTR includes a criterion of 8.85 µg/L for tetrachloroethylene for the protection of human health for waters from which organisms only are consumed, which is applicable for waters without the MUN use. DDW has adopted a Primary MCL for tetrachloroethylene of 5 µg/L, which is applicable for waters with the MUN use through the Basin Plans' chemical constituent objective.

ix. **Zinc.** The CTR includes hardness-dependent criteria for the protection of freshwater aquatic life for zinc. Attachment C includes screening levels for zinc based on the CTR aquatic life criteria for multiple increments of hardness between 0 mg/L and 400 mg/L. The Central Valley Water Board will determine the hardness to be used to select the appropriate screening level in accordance with the approach detailed in section V.C.2.e of this Fact Sheet. If the discharge exhibits reasonable potential to cause or contribute to an exceedance of water quality objectives/criteria for zinc, the same hardness will be used to determine the appropriate effluent limitations for zinc from section V.A.1.b.iii of this General Order, which shall be specified in the Notice of Applicability.

The CTR aquatic life criteria for zinc are presented in dissolved concentrations, as 1-hour acute criteria and 4-day chronic criteria. As discussed in section V.C.2.d of this Fact Sheet, U.S. EPA recommends conversion factors to translate dissolved concentrations to total concentrations. In the absence of site-specific translators, the default U.S. EPA translators were used to calculate the screening levels and effluent limitations for zinc. For the City of Grass Valley, Wastewater Treatment Plant, this General Order allows for the acute and chronic CTR criteria and associated effluent limitations (if necessary) for zinc to be calculated using site-specific translators. If a Discharger performs studies to determine a site-specific translator, this General Order may be reopened to allow effluent limitations to be modified for that Discharger.

The CTR aquatic life criteria are also expressed as a function of the WER. In the absence of a site-specific WER, a default WER of 1 was used to calculate the screening levels and effluent limitations for zinc. The Central Valley Water Board has approved site-specific WER's in the individual NPDES permits for the above Dischargers (see Table F-4). Consistent with the individual NPDES permits, this General Order allows for the CTR criteria and associated effluent limitations (if necessary) for zinc to be calculated using using the site-specific WER's for these Dischargers. If a Discharger performs studies to determine a site-specific WER, this General Order may be reopened to allow effluent limitations to be modified for that Discharger.

DDW has adopted a Secondary MCL for zinc of 5,000 µg/L, which is applicable for waters with the MUN use through the Basin Plans' chemical constituent objective.

Table III-1 of the Basin Plan for the Sacramento and San Joaquin River Basins includes a site-specific objective of 100 µg/L for dissolved zinc in the Sacramento-San Joaquin Delta. Using the default U.S. EPA acute translator of 0.978, the objective is 102 µg/L as total recoverable. The Central Valley Water Board has identified the following Dischargers located in the Sacramento-San Joaquin Delta as being potentially eligible for coverage under this General Order: City of Lodi, White Slough Water Pollution Control Facility; and City of Manteca and Dutra Farms, Inc., Wastewater Quality Control Facility. This General Order includes a screening level in Attachment C and effluent limitations in section V.A.1.b.iv of this General Order for total recoverable zinc based on the site-specific objective, which are applicable to discharges within the Sacramento-San Joaquin Delta.

b. Other Constituents of Concern

Attachment C includes screening levels for several other constituents of concern. For waters with the MUN use, the screening levels are based on the most stringent Basin Plan numeric and narrative objectives (including those for protection of drinking water supplies) and MCL's. For waters without the MUN use, the screening levels are based on the most stringent Basin Plan numeric and narrative objectives (excluding those for protection of drinking water supplies).

Federal regulations at 40 C.F.R. section 122.44(d)(1)(i) require that, "*Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.*" For priority pollutants, the SIP dictates the

procedures for conducting the RPA. For other constituents of concern, the Central Valley Water Board is not restricted to one particular RPA method. The Central Valley Water Board has used its judgment in determining the appropriate method for conducting the RPA for other constituents of concern in this General Order. To conduct the RPA for other constituents of concern, the Central Valley Water Board will use the effluent and ambient background data as discussed in section V.C.2.b, the screening levels in Attachment C, and the pollutant-specific procedures detailed in this section.

Based on the evaluation of pollutants with applicable effluent limitations in individual NPDES permits for Dischargers that are potentially eligible for coverage under this General Order, the Central Valley Water Board has identified the following other constituents of concern in discharges from municipal wastewater treatment plants: aluminum, ammonia, chlorine residual, diazinon and chlorpyrifos, fluoride, manganese, mercury and methylmercury, methylene blue active substances (MBAS or foaming agents), nitrate plus nitrite, nitrite, pathogens, pH, salinity, settleable solids and temperature. This General Order includes effluent limitations for these other constituents of concern. Based on the RPA results for a specific Discharger, the Notice of Applicability will specify effluent limitations for those other constituents of concern present in the discharge at concentrations that exhibit reasonable potential to cause or contribute to an exceedance of water quality objectives/criteria. The applicable water quality objectives/criteria for the other constituents of concern in discharges from municipal wastewater treatment plants are as follows:

i. **Aluminum.** Aluminum is the third most abundant element in the earth's crust and is ubiquitous in both soils and aquatic sediments. When mobilized in surface waters, aluminum has been shown to be toxic to various fish species. However, the potential for aluminum toxicity in surface waters is directly related to the chemical form of aluminum present, and the chemical form is highly dependent on water quality characteristics that ultimately determine the mechanism of aluminum toxicity. Surface water characteristics, including pH, temperature, colloidal material, fluoride and sulfate concentrations, and total organic carbon, all influence aluminum speciation and its subsequent bioavailability to aquatic life. Calcium [hardness] concentrations in surface water may also reduce aluminum toxicity by competing with monomeric aluminum (Al^{3+}) binding to negatively charged fish gills.

   The Code of Federal Regulations promulgated criteria for priority toxic pollutants for California's surface waters as part of section 131.38 Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California (California Toxics Rule or CTR), including metals criteria. However, aluminum criteria were not promulgated as part of the CTR. Absent numeric aquatic life criteria for aluminum, WQBEL's in the Central Valley Region's NPDES permits are based on the Basin Plans' narrative toxicity objective. The Basin Plans' Policy for Application of Water Quality Objectives requires the Central Valley Water Board to consider, "*on a case-by-case basis, direct evidence of beneficial use impacts, all material and relevant information submitted by the discharger and other interested parties, and relevant numerical criteria and guidelines developed and/or published by other agencies and organizations. In considering such criteria, the Board evaluates whether the specific numerical criteria which are available through these sources and through other information supplied to the Board, are relevant and appropriate to the situation at hand and, therefore, should be used in determining compliance with the narrative objective.*" Relevant

information includes, but is not limited to (1) U.S. EPA Ambient Water Quality Criteria (NAWQC) and subsequent Correction, (2) site-specific conditions of the receiving water, and (3) site-specific aluminum studies conducted by dischargers within the Central Valley Region. (Basin Plan, p. IV.-17.00; see also, 40 C.F.R. 122.44(d)(vi).)

U.S. EPA NAWQC. U.S. EPA recommended the NAWQC aluminum acute criterion at 750 µg/L based on test waters with a pH of 6.5 to 9.0. U.S. EPA also recommended the NAWQC aluminum chronic criterion at 87 µg/L based upon toxicity tests. All test waters contained hardness at 12 mg/L as $CaCO_3$.

(a) Acute toxicity tests at various aluminum doses were conducted in various acidic waters (pH 6.0 – 6.5) on 159- and 160-day old striped bass. The 159-day old striped bass showed no mortality in waters with pH at 6.5 and aluminum doses at 390 µg/L, and the 160-day old striped bass showed 58% mortality at a dose of 174.4 µg/L in same pH waters. However, the 160-day old striped bass showed 98% mortality at an aluminum dose of 87.2 µg/L in waters with pH at 6.0, which is U.S. EPA's basis for the 87 µg/L chronic criterion. The varied results draw into question this study and the applicability of the NAWQC chronic criterion of 87 µg/L.

(b) Chronic toxicity effects on 60-day old brook trout were evaluated in circumneutral pH waters (6.5-6.9 pH) in five cells at various aluminum doses (4, 57, 88, 169, and 350 µg/L). Chronic evaluation started upon hatching of eyed eggs of brook trout, and their weight and length were measured after 45 days and 60 days. The 60-day old brook trout showed 24% weight loss at 169 µg/L of aluminum and 4% weight loss at 88 µg/L of aluminum, which is the basis for U.S. EPA's chronic criteria. Though this test study shows chronic toxic effects of 4% reduction in weight after exposure for 60-days, the chronic criterion is based on 4-day exposure; so again, the applicability of the NAWQC chronic criterion of 87 µg/L is questionable.

Site-specific Conditions. U.S. EPA advises that a WER may be more appropriate to better reflect the actual toxicity of aluminum to aquatic organisms when the pH and hardness conditions of the receiving water are not similar to that of the test conditions.[1] Where effluent and receiving water monitoring data indicate that the pH and hardness values are not similar to the low pH and hardness conditions under which the chronic criterion for aluminum was developed, the Central Valley Water Board does not expect aluminum to be as toxic in the receiving water as in the previously described toxicity tests.

Local Environmental Conditions and Studies. Twenty-one site-specific aluminum toxicity tests have been conducted within the Central Valley Region. Where the pH and hardness of a receiving water are similar to those shown in the table below, the results of the site-specific aluminum toxicity tests may be relevant and appropriate for the receiving water. As shown in the following table, all EC_{50}[2] toxicity study result values are at concentrations of aluminum above

[1] "The value of 87 micro-g/L is based on a toxicity test with striped bass in water with pH = 6.5-6.6 and hardness < 10 mg/L. Data in [a 1994 Study] indicate that aluminum is substantially less toxic at higher pH and hardness, but the effects of pH and hardness are not well quantified at this time." U.S. EPA 1999 NAWQC Correction, Footnote L

[2] The effect concentration is a point estimate of the toxicant concentration that would cause an observable adverse effect (e.g. death, immobilization, or serious incapitation) in a given percent of the test organisms, calculated from a continuous model (e.g., Probit Model). EC_{50} is a point estimate of the toxicant concentration

5,000 µg/L. Thus, the toxic effects of aluminum in these surface waters, is less toxic (or less reactive) to aquatic species then demonstrated in the toxicity tests that U.S. EPA used for the basis of establishing the chronic criterion of 87 µg/L. This new information, and review of the toxicity tests U.S. EPA used to establish the chronic criterion, indicates that 87 µg/L is overly stringent and may not be applicable to all water bodies in the Central Valley Region.

Central Valley Region Site-Specific Aluminum Toxicity Data

Discharger	Test Waters	Hardness Value	Total Aluminum EC_{50} Value	pH	WER
***Oncorhynchus mykiss* (rainbow trout)**					
Manteca	Surface Water/Effluent	124	>8600	9.14	N/C
Auburn	Surface Water	16	>16500	7.44	N/C
Modesto	Surface Water/Effluent	120/156	>34250	8.96	>229
Yuba City	Surface Water/Effluent	114/164[1]	>8000	7.60/7.46	>53.5
***Ceriodaphnia dubia* (water flea)**					
Auburn	Effluent	99	>5270	7.44	>19.3
	Surface Water	16	>5160	7.44	>12.4
Manteca	Surface Water/Effluent	124	>8800	9.14	N/C
	Effluent	117	>8700	7.21	>27.8
	Surface Water	57	7823	7.58	25.0
	Effluent	139	>9500	7.97	>21.2
	Surface Water	104	>11000	8.28	>24.5
	Effluent	128	>9700	7.78	>25.0
	Surface Water	85	>9450	7.85	>25.7
	Effluent	106	>11900	7.66	>15.3
	Surface Water	146	>10650	7.81	>13.7
Modesto	Surface Water/Effluent	120/156	31604	8.96	211
Yuba City	Surface Water/Effluent	114/164[1]	>8000	7.60/7.46	>53.5
Placer County (SMD 1)	Effluent	150	>5000	7.4 – 8.7	>13.7
***Daphnia magna* (water flea)**					
Manteca	Surface Water/Effluent	124	>8350	9.14	N/C
Modesto	Surface Water/Effluent	120/156	>11900	8.96	>79.6
Yuba City	Surface Water/Effluent	114/164[1]	>8000	7.60/7.46	>53.5

The Central Valley Water Board will evaluate site-specific information for each Discharger to determine the applicability of the NAWQC chronic criterion to a receiving water, including effluent and receiving water pH and hardness data and site-specific study information.

DDW has established Secondary MCL's to assist public drinking water systems in managing their drinking water for aesthetic conditions such as taste, color, and odor. The Secondary MCL for aluminum is 200 µg/L for protection of the MUN beneficial use. Title 22 requires compliance with Secondary MCL's on an annual average basis.

The applicable screening levels and effluent limitations shall be applied as follows:

that would cause an observable adverse effect in 50 percent of the test organisms. The EC_{50} is used in toxicity testing to determine the appropriate chronic criterion.

(a) If the Central Valley Water Board determines that the NAWQC chronic criterion is not applicable to a receiving water with the MUN use, the screening level and associated effluent limitations (if applicable) will be based on the Secondary MCL of 200 µg/L. The Secondary MCL is derived from human welfare considerations (e.g., taste, odor, laundry staining), not for toxicity. Secondary MCL's are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. To be consistent with how compliance with the standards is determined, the Central Valley Water Board will conduct the RPA for aluminum for this scenario by comparing the maximum observed calendar year annual average effluent aluminum concentration to the screening level.

(b) If the Central Valley Water Board determines that the NAWQC chronic criterion is not applicable to a receiving water without the MUN use, the screening level and associated effluent limitations (if applicable) will be based on the NAWQC acute criterion of 750 µg/L. The Central Valley Water Board will conduct the RPA for aluminum for this scenario by comparing the maximum observed effluent aluminum concentration to the screening level.

(c) If the Central Valley Water Board determines that the NAWQC chronic criterion is applicable to a receiving water, the screening level and associated effluent limitations (if applicable) will be based on the NAWQC chronic criterion (regardless of the applicability of the MUN use). The Central Valley Water Board will conduct the RPA for aluminum for this scenario by comparing the maximum observed effluent aluminum concentration to the screening level.

ii. **Ammonia.** The 1999 U.S. EPA NAWQC for the protection of freshwater aquatic life for total ammonia (the "1999 Criteria"), recommends acute (1-hour average; criteria maximum concentration or CMC) standards based on pH and chronic (30-day average; criteria continuous concentration or CCC) standards based on pH and temperature. U.S. EPA also recommends that no 4-day average concentration should exceed 2.5 times the 30-day CCC.

The U.S. EPA recently published national recommended water quality criteria for the protection of aquatic life from the toxic effects of ammonia in freshwater (the "2013 Criteria")[1]. The 2013 Criteria is an update to U.S. EPA's 1999 Criteria, and varies based on pH and temperature. Although the 2013 Criteria reflects the latest scientific knowledge on the toxicity of ammonia to certain freshwater aquatic life, including new toxicity data on sensitive freshwater mussels in the Family Unionidae, the species tested for development of the 2013 Criteria may not be present in some Central Valley waterways. The 2013 Criteria document therefore states that, "*unionid mussel species are not prevalent in some waters, such as the arid west …*" and provides that, "*In the case of ammonia, where a state demonstrates that mussels are not present on a site-specific basis, the recalculation procedure may be used to remove the mussel species from the national criteria dataset to better represent the species present at the site.*"

The Central Valley Water Board issued a 3 April 2014 *California Water Code Section 13267 Order for Information: 2013 Final Ammonia Criteria for Protection of Freshwater Aquatic Life* (13267 Order) requiring Dischargers to either

[1] Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater, published August 2013 [EPA 822-R-13-001]

participate in an individual or group study to determine the presence of mussels or submit a method of compliance for complying with effluent limitations calculated assuming mussels present using the 2013 Criteria. Studies are currently underway to determine how the latest scientific knowledge on the toxicity of ammonia reflected in the 2013 Criteria can be implemented in the Central Valley Region as part of a Basin Planning effort to adopt nutrient and ammonia objectives. Until the Basin Planning process is completed, the Central Valley Water Board will continue to implement the 1999 Criteria to interpret the Basin Plans' narrative toxicity objective. The 1999 NAWQC for the protection of freshwater aquatic life for total ammonia, recommends acute (1-hour average; criteria maximum concentration or CMC) standards based on pH and chronic (30-day average; criteria continuous concentration or CCC) standards based on pH and temperature. U.S. EPA also recommends that no 4-day average concentration should exceed 2.5 times the 30-day CCC. U.S. EPA found that as pH increased, both the acute and chronic toxicity of ammonia increased. Salmonids were more sensitive to acute toxicity effects than other species. However, while the acute toxicity of ammonia was not influenced by temperature, it was found that invertebrates and young fish experienced increasing chronic toxicity effects with increasing temperature. The recommended criteria for waters where salmonids are present and absent, and early life stages are present, have been used in this General Order. In determining the appropriate acute criterion, the Central Valley Water Board will evaluate site-specific information to determine the presence or absence of salmonids in the receiving water, including the applicability of the cold freshwater habitat (COLD).

This General Order covers facilities that treat domestic wastewater. Untreated domestic wastewater contains ammonia in concentrations that, without treatment, would be harmful to fish and would violate the Basin Plan narrative toxicity objective if discharged to the receiving water. Reasonable potential therefore exists and effluent limitations are required for all Dischargers covered by this General Order.

U.S. EPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBEL's are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBEL's for pathogens in all permits for POTW's discharging to contact recreational waters).*" U.S. EPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data.*" With regard to POTW's, U.S. EPA recommends that, "*POTW's should also be characterized for the possibility of chlorine and ammonia problems.*" (TSD, p. 50)

Nitrification is a biological process that converts ammonia to nitrite and nitrite to nitrate. Denitrification is a process that converts nitrate to nitrite or nitric oxide and then to nitrous oxide or nitrogen gas, which is then released to the

atmosphere. Inadequate or incomplete nitrification may result in the discharge of ammonia to the receiving stream. Ammonia is known to cause toxicity to aquatic organisms in surface waters. Discharges of ammonia in concentrations that produce detrimental physiological responses to human, plant, animal, or aquatic life would violate the Basin Plan narrative toxicity objective. Inadequate or incomplete nitrification creates the potential for ammonia to be discharged and provides the basis for the discharge to have a reasonable potential to cause or contribute to an in-stream excursion above the NAWQC. Therefore, the Central Valley Water Board finds the discharges covered by this General Order have reasonable potential for ammonia and WQBEL's are required.

In order to protect against the worst-case short-term exposure of an organism, Attachment C includes screening levels based on the acute criterion (CMC) using pH values between 7.8 and 9.0. The screening level applicable to each Discharger shall be determined based on the maximum permitted pH or on the maximum observed effluent pH, whichever is lower. This screening level shall be used to determine the appropriate effluent limitations for ammonia from Tables 16A through 16D of this General Order, which shall be specified in the Notice of Applicability.

Attachment C includes screening levels based on the chronic criterion (30-day CCC) for a range of pH and temperatures. The Central Valley Water Board will determine the applicable screening level based on downstream receiving water pH and temperature data. If at least monthly paired pH and temperature receiving water data are available, the CCC will be determined by selecting a CCC from Tables C-5A and C-5B of Attachment C for each day when paired data are available, calculating a rolling 30-day average CCC, and selecting the minimum observed 30-day CCC. If sufficient paired receiving water data are not available, the CCC will be selected from Tables C-5A and C-5B of Attachment C using the maximum observed pH and 30-day average temperature of the downstream receiving water. Tables 15A through 15N of this General Order include effluent limitations for a range of CCC's, in 0.5 mg/L increments. The selected screening level from Attachment C shall be used to determine the appropriate effluent limitations for ammonia from Tables 15A through 15N of this General Order, which shall be specified in the Notice of Applicability.

iii. **Chlorine, Total Residual.** U.S. EPA developed NAWQC for protection of freshwater aquatic life for chlorine residual. The recommended 4-day average (chronic) and 1-hour average (acute) criteria for chlorine residual are 0.011 mg/L and 0.019 mg/L, respectively. These criteria are protective of the Basin Plans' narrative toxicity objective.

U.S. EPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBEL's are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBEL's for pathogens in all permits for POTW's discharging to contact recreational waters).*" U.S. EPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a*

variety of factors and information where facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data." With regard to POTW's, U.S. EPA recommends that, "*POTW's should also be characterized for the possibility of chlorine and ammonia problems.*" (TSD, p. 50)

Chlorine is extremely toxic to aquatic organisms. For Dischargers that utilize chlorine disinfection, the chlorine use and the potential for chlorine to be discharged provides the basis for the discharge to have a reasonable potential to cause or contribute to an in-stream excursion above the NAWQC.

iv. **Diazinon and Chlorpyrifos.** The Central Valley Water Board completed TMDL's for diazinon and chlorpyrifos in the Sacramento-San Joaquin Delta, Sacramento and Feather Rivers, and the San Joaquin River and amended the Basin Plan for the Sacramento and San Joaquin River Basins to include diazinon and chlorpyrifos WLA's and water quality objectives.

Chapter III (Water Quality Objectives) of the Basin Plan for the Sacramento and San Joaquin River Basins includes site-specific numeric objectives for diazinon and chlorpyrifos in these water bodies and Chapter IV (Implementation) identifies the requirements to meet the additive formula for the additive toxicity of diazinon and chlorpyrifos.

The Basin Plan states that "*The Waste Load Allocations (WLA) for all NPDES-permitted dischargers…shall not exceed the sum (S) of one (1) as defined below.*

$$S = \frac{C_d}{WQO_d} + \frac{C_c}{WQO_c} \leq 1.0$$

Where:

C_D = *diazinon concentration in µg/L of point source discharge for WLA…*

C_C = *chlorpyrifos concentration in µg/L of point source discharge for the WLA…*

WQO_d = *acute or chronic diazinon water quality objective in µg/L.*

WQO_c = *acute or chronic chlorpyrifos water quality objective in µg/L.*

Available samples collected within the applicable averaging period for the water quality objective will be used to determine compliance with the allocations and loading capacity. For purposes of calculating the sum (S) above, analytical results that are reported as 'non-detectable' concentrations are considered to be zero."

The water quality objectives for chlorpyrifos are 0.025 µg/L as a 1-hour average (acute) and 0.015 µg/L as a 4-day average (chronic), not to be exceeded more than once in a 3-year period. The water quality objectives for diazinon are 0.16 µg/L as a 1-hour average (acute) and 0.10 µg/L as a 4-day average (chronic), not to be exceeded more than once in a 3-year period.

Due to the TMDL for diazinon and chlorpyrifos in the Sacramento-San Joaquin Delta, Sacramento and Feather Rivers, and the San Joaquin River, WQBEL's for these constituents are required for discharges to these water bodies. The TMDL WLA applies to all NPDES dischargers to these water bodies and will serve as the basis for WQBEL's.

v. **Fluoride.** DDW has adopted a Primary MCL for fluoride of 2,000 µg/L, which is applicable for waters with the MUN use through the Basin Plans' chemical

constituent objective. Primary MCL's are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. To be consistent with how compliance with the standards is determined, the Central Valley Water Board will conduct the RPA for fluoride for waters with the MUN use by comparing the maximum observed calendar year annual average effluent fluoride concentration to the screening level. This Order does not include screening levels or effluent limitations for fluoride for waters without the MUN use.

vi. **Manganese.** DDW has adopted a Secondary MCL for manganese of 50 µg/L, which is applicable for waters with the MUN use through the Basin Plans' chemical constituent objective. The Secondary MCL is derived from human welfare considerations (e.g., taste, odor, laundry staining), not for toxicity. Secondary MCL's are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. To be consistent with how compliance with the standards is determined, the Central Valley Water Board will conduct the RPA for manganese for waters with the MUN use by comparing the maximum observed calendar year annual average effluent manganese concentration to the screening level. This Order does not include screening levels or effluent limitations for manganese for waters without the MUN use.

vii. **Mercury and Methylmercury**

(a) **Applicable to Discharges in the Sacramento-San Joaquin Delta.** The Basin Plan for the Sacramento and San Joaquin River Basins contains fish tissue objectives for all Delta waterways listed in Appendix 43 of the Basin Plan that states *"…the average methylmercury concentrations shall not exceed 0.08 and 0.24 mg methylmercury/kg, wet weight, in muscle tissue of trophic level 3 and 4 fish, respectively (150-500 mm total length.) The average methylmercury concentrations shall not exceed 0.03 mg methylmercury/kg, wet weight, in whole fish less than 50 mm in length*". The Delta Mercury Control Program contains aqueous methylmercury WLA's that are calculated to achieve these fish tissue objectives. Methylmercury reductions are assigned to dischargers with concentrations of methylmercury greater than 0.06 mg/L (the concentration of methylmercury in water to meet the fish tissue objective). Table IV-7B of the Basin Plan specifies the WLA's for methylmercury for NPDES dischargers in the Delta. The Central Valley Water Board has identified the following Dischargers located in the Sacramento-San Joaquin Delta as being potentially eligible for coverage under this General Order: City of Lodi, White Slough Water Pollution Control Facility; and City of Manteca and Dutra Farms, Inc., Wastewater Quality Control Facility. This General Order includes effluent limitations for methylmercury for these facilities based on the WLA's in the Basin Plan, which shall apply to these facilities upon issuance of a Notice of Applicability from the Executive Officer.

(b) **Applicable to 303(d)-Listed Water Bodies.** Many water bodies in the Central Valley Region are listed on the 303(d) list as impaired for mercury. The Central Valley Water Board is in the process of developing TMDL's for these water bodies. In order to limit mercury loads to current levels until TMDL's can be established, this General Order requires effluent

performance-based effluent limitations for Dischargers proposing to discharge to water bodies that are impaired for mercury. If the Central Valley Water Board plans to adopt a TMDL after the year 2022, this Order includes a final effluent limitation for total mercury. If the Central Valley Water Board plans to adopt a TMDL before the year 2022 (i.e., within the term of this General Order), this General Order includes an interim effluent limitation for total mercury effective until this General Order is amended to implement a WLA adopted as part of a TMDL for mercury.

viii. **Methylene Blue Active Substances (MBAS or Foaming Agents).** DDW has adopted a Secondary MCL for MBAS of 0.5 mg/L, which is applicable for waters with the MUN use through the Basin Plans' chemical constituent objective. The Secondary MCL is derived from human welfare considerations (e.g., taste, odor, laundry staining), not for toxicity. Secondary MCL's are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. To be consistent with how compliance with the standards is determined, the Central Valley Water Board will conduct the RPA for MBAS for waters with the MUN use by comparing the maximum observed calendar year annual average effluent MBAS concentration to the screening level. This Order does not include screening levels or effluent limitations for MBAS for waters without the MUN use.

ix. **Nitrate and Nitrite.** DDW has adopted Primary MCL's for the protection of human health for nitrite and nitrate that are equal to 1 mg/L and 10 mg/L (measured as nitrogen), respectively. DDW has also adopted a Primary MCL of 10 mg/L for the sum of nitrate and nitrite, measured as nitrogen.

U.S. EPA has developed a Primary MCL and an MCL goal of 1 mg/L for nitrite (as nitrogen). For nitrate, U.S. EPA has developed Drinking Water Standards (10 mg/L as Primary MCL) and NAWQC for protection of human health (10 mg/L for non-cancer health effects).

This General Order covers facilities that treat domestic wastewater. Untreated domestic wastewater contains ammonia in concentrations that, if untreated, will be harmful to fish and will violate the Basin Plans' narrative toxicity objective. This Order, therefore, requires removal of ammonia (i.e., nitrification). Nitrification is a biological process that converts ammonia to nitrate and nitrite, and will result in effluent nitrate concentrations above the Primary MCL for nitrate plus nitrite. Nitrate concentrations in a drinking water supply above the Primary MCL threatens the health of human fetuses and newborn babies by reducing the oxygen-carrying capacity of the blood (methemoglobinemia). Reasonable potential for nitrate and nitrite therefore exists and WQBEL's are required.

U.S. EPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBEL's are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBEL's for pathogens in all permits for POTW's discharging to contact recreational waters).*" U.S. EPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to*

cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data." With regard to POTW'S, U.S. EPA recommends that, "*POTW's should also be characterized for the possibility of chlorine and ammonia problems.*" (TSD, p. 50)

The concentration of nitrogen in raw domestic wastewater is sufficiently high that the resultant treated wastewater has a reasonable potential to exceed or threaten to exceed the Primary MCL for nitrate plus nitrite unless the wastewater is treated for nitrogen removal, and therefore an effluent limit for nitrate plus nitrite is required for all Dischargers to waters with the MUN use. Denitrification is a process that converts nitrate to nitrite or nitric oxide and then to nitrous oxide or nitrogen gas, which is then released to the atmosphere. Inadequate or incomplete denitrification may result in the discharge of nitrate and/or nitrite to the receiving stream. Discharges of nitrate plus nitrite in concentrations that exceed the Primary MCL would violate the Basin Plan narrative chemical constituents objective. Inadequate or incomplete denitrification creates the potential for nitrate and nitrite to be discharged and provides the basis for the discharge to have a reasonable potential to cause or contribute to an in-stream excursion above the Primary MCL. Therefore, the Central Valley Water Board finds the discharge has reasonable potential for nitrate plus nitrite and WQBEL's are required for all Dischargers to waters with the MUN use.

Attachment C includes a screening level and section V.A.1.c.vi of this General Order includes effluent limitations for nitrite based on the Primary MCL for discharges to waters with the MUN use. If the maximum effluent nitrite concentration exceeds the screening level in Attachment C, then effluent limitations for nitrite will be specified in the Notice of Applicability.

x. **Pathogens**

(a) **Secondary Treatment Requirements.** In a letter to the Central Valley Water Board dated 8 April 1999, DDW indicated it would consider wastewater discharged to water bodies with identified beneficial uses of irrigation or contact recreation and where the wastewater receives dilution of more than 20:1 to be adequately disinfected if the effluent coliform concentration does not exceed 23 MPN/100 mL as a 7-day median and if the effluent coliform concentration does not exceed 240 MPN/100 mL more than once in any 30 day period.

DDW drafted *Uniform Guidelines for Wastewater Disinfection* (retyped in November 2000) that recommend treatment and disinfection levels of discharges to waters of the State. The *Uniform Guidelines for Wastewater Disinfection* recommend treated wastewater have a median coliform bacteria of 23 MPN/100 mL when:

(1) Discharges are to ephemeral streams that have little or no natural flow all or part of the year,

(2) There is no nearby habitation,

(3) There is limited use of the discharge area, and

(4) Contact with the effluent is not encouraged.

Pursuant to DDW's 8 April 1999 memo and *Uniform Guidelines for Wastewater Disinfection*, this Order includes effluent limitations for total coliform organisms of 23 MPN/100 mL as a 7-day median and 240 MPN/100 mL, not to be exceeded more than once in a 30-day period for Dischargers of secondary treated wastewater that meet the eligibility criteria in section I.B.3 of this General Order. These coliform limits are imposed to protect the beneficial uses of the receiving water, including public health through contact recreation and drinking water pathways.

(b) **Tertiary Treatment Requirements.** DDW has developed reclamation criteria, CCR, Division 4, Chapter 3 (Title 22), for the reuse of wastewater. Title 22 requires that for spray irrigation of food crops, parks, playgrounds, schoolyards, and other areas of similar public access, wastewater be adequately disinfected, oxidized, coagulated, clarified, and filtered, and that the effluent total coliform levels not exceed 2.2 MPN/100 mL as a 7-day median; 23 MPN/100 mL, not to be exceeded more than once in a 30-day period; and 240 MPN/100 mL, at any time.

Title 22 also requires that recycled water used as a source of water supply for non-restricted recreational impoundments be disinfected tertiary recycled water that has been subjected to conventional treatment. A non-restricted recreational impoundment is defined as *"...an impoundment of recycled water, in which no limitations are imposed on body-contact water recreational activities."* Title 22 is not directly applicable to surface waters; however, the Central Valley Water Board finds that it is appropriate to apply an equivalent level of treatment to that required by the DDW's reclamation criteria for discharges to receiving waters that are used for irrigation of agricultural land and for contact recreation purposes and that do not receive 20:1 dilution at all times. The stringent disinfection criteria of Title 22 are appropriate since the undiluted effluent may be used for the irrigation of food crops and/or for body-contact water recreation. Coliform organisms are intended as an indicator of the effectiveness of the entire treatment train and the effectiveness of removing other pathogens.

Raw domestic wastewater inherently contains human pathogens that threaten human health and life, and constitute a threatened pollution and nuisance under CWC Section 13050 if discharged untreated to the receiving water. Reasonable potential for pathogens therefore exists and WQBEL's are required.

U.S. EPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available...A permitting authority might also determine that WQBEL's are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBEL's for pathogens in all permits for POTW's discharging to contact recreational waters).*" U.S. EPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where facility-specific effluent monitoring data are*

unavailable. These factors also should be considered with available effluent monitoring data." (TSD, p. 50)

To protect the beneficial uses of receiving waters with the municipal and domestic supply, water contact recreation, and agricultural irrigation supply beneficial uses that, at times, have less than 20:1 dilution, the Central Valley Water Board finds that the wastewater must be disinfected and adequately treated to prevent disease. Although the Dischargers covered by this General Order provide disinfection, inadequate or incomplete disinfection creates the potential for pathogens to be discharged. Therefore, the Central Valley Water Board finds the discharge has reasonable potential for pathogens and WQBEL's are required.

In accordance with the requirements of Title 22, this Order includes effluent limitations for total coliform organisms of 2.2 MPN/100 mL as a 7-day median; 23 MPN/100 mL, not to be exceeded more than once in a 30-day period; and 240 MPN/100 mL as an instantaneous maximum for Dischargers that have discharges that do not receive 20:1 dilution at all times (except where the discharges meets the conditions in the *Uniform Guidelines for Wastewater Disinfection*), or that are otherwise required to provide tertiary treatment (e.g., where DDW has made a site-specific recommendation that tertiary treatment in addition to 20:1 dilution is necessary or where tertiary treatment has been required to comply with State and federal antidegradation requirements).

The tertiary treatment process, or equivalent, is capable of reliably treating wastewater to a turbidity level of 2 nephelometric turbidity units (NTU) as a daily average. Failure of the filtration system such that virus removal is impaired would normally result in increased particles in the effluent, which result in higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance. Coliform testing, by comparison, is not conducted continuously and requires several hours, to days, to identify high coliform concentrations. Therefore, to ensure compliance with the DDW recommended Title 22 disinfection criteria, weekly average specifications are impracticable for turbidity. For granular media filtration systems or equivalent, this Order includes operational specifications for turbidity of 2 NTU as a daily average; 5 NTU, not to be exceeded more than 5 percent of the time within a 24-hour period; and 10 NTU as an instantaneous maximum. For membrane filtration systems or equivalent, this Order includes operational specifications for turbidity of 0.2 NTU, not to be exceeded more than 5 percent of the time within a 24-hour period; and 0.5 NTU as an instantaneous maximum.

This Order contains effluent limitations for BOD_5, total coliform organisms, and TSS and requires a tertiary level of treatment, or equivalent, necessary to protect the beneficial uses of the receiving water. The Central Valley Water Board has previously considered the factors in Water Code section 13241 in establishing these requirements for the existing Dischargers with individual NPDES permits that are potentially eligible for coverage under this General Order.

Final WQBEL's for BOD_5 and TSS are based on the technical capability of the tertiary process, which is necessary to protect the beneficial uses of the receiving water. BOD_5 is a measure of the amount of oxygen used in the

biochemical oxidation of organic matter. The tertiary treatment standards for BOD_5 and TSS are indicators of the effectiveness of the tertiary treatment process. The principal design parameter for wastewater treatment plants is the daily BOD_5 and TSS loading rates and the corresponding removal rate of the system. The application of tertiary treatment processes results in the ability to achieve lower levels for BOD_5 and TSS than the secondary standards currently prescribed. Therefore, this Order requires AMEL's for BOD_5 and TSS of 10 mg/L, which is technically based on the capability of a tertiary system. In addition to the average weekly and average monthly effluent limitations, a daily maximum effluent limitation for BOD_5 and TSS is included in the Order to ensure that the treatment works are not organically overloaded and operate in accordance with design capabilities. For some facilities, the Central Valley Water Board has also established a 90 percent removal limitation for BOD_5 and TSS, which is more stringent than the secondary treatment standards. In accordance with anti-backsliding requirements, this General Order specifies that 90 percent removal limitations be retained from a Discharger's current permit, if applicable.

xi. **pH.** The Sacramento and San Joaquin River Basin Plan and the Tulare Lake Basin Plan contain the following pH water quality objectives:

(a) The pH of all discharges within the Sacramento and San Joaquin River Basins (except Goose Lake in Modoc County) shall at all times be within the range of 6.5 and 8.5.

(b) The pH of all discharges to Goose Lake in Modoc County shall at all times be within the range of 7.5 and 9.5.

(c) The pH of all discharges within the Tulare Lake Basin shall at all times be within the range of 6.5 and 8.3.

Raw domestic wastewater inherently has variable pH. Additionally, some wastewater treatment processes can increase or decrease wastewater pH which if not properly controlled, would violate the Basin Plans' numeric objective for pH in the receiving water. Therefore, reasonable potential exists for pH and WQBEL's are required.

U.S. EPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBEL's are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBEL's for pathogens in all permits for POTW's discharging to contact recreational waters).*" U.S. EPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data.*" (TSD, p. 50)

This General Order covers facilities that treat domestic wastewater. Although the Dischargers to be covered under this General Order may have the proper pH

controls in place, the pH of the influent varies due to the nature of municipal sewage, which provides the basis for these types of discharges to have a reasonable potential to cause or contribute to an in-stream excursion above the Basin Plans' numeric objective for pH. Therefore, WQBEL's for pH are required for all Dischargers covered under this General Order.

This General Order does not contain screening levels for pH. However, this Order does contain effluent limitations for pH based on the criteria discussed above.

xii. **Salinity**

(a) **Discharges in the Sacramento and San Joaquin River Basins.** The Basin Plan for the Sacramento and San Joaquin River Basins contains a chemical constituent objective that incorporates state MCL's, contains a narrative objective, and contains numeric water quality objectives for certain specified water bodies for electrical conductivity, total dissolved solids, sulfate, and chloride. The U.S. EPA Ambient Water Quality Criteria for Chloride recommends acute and chronic criteria for the protection of aquatic life. There are no U.S. EPA water quality criteria for the protection of aquatic life for electrical conductivity, total dissolved solids, and sulfate. Additionally, there are no U.S. EPA numeric water quality criteria for the protection of agricultural, livestock, and industrial uses. Numeric values for the protection of these uses are typically based on site specific conditions and evaluations to determine the appropriate constituent threshold necessary to interpret the narrative chemical constituent Basin Plan objective. The Central Valley Water Board must determine the applicable numeric limit to implement the narrative objective for the protection of agricultural supply. The Central Valley Water Board is currently implementing the CV-SALTS initiative to develop a Basin Plan Amendment that will establish a salt and nitrate Management Plan for the Central Valley. Through this effort the Basin Plan will be amended to define how the narrative water quality objective is to be interpreted for the protection of agricultural use. All studies conducted through this Order to establish an agricultural limit to implement the narrative objective will be reviewed by and consistent with the efforts currently underway by CV-SALTS.

The Central Valley Water Board adopted a Basin Plan Amendment on 9 June 2017, which establishes salinity water quality objectives in the Lower San Joaquin River form Merced River to Vernalis. Furthermore, the Basin Plan Amendment modified the Salt and Boron TMDL to clarify that NPDES point source dischargers could participate in the real-time salinity management program in lieu of complying with the wasteload allocations. Therefore, this Order includes a reopener provision to modify salinity requirements, as appropriate, in accordance with the Basin Plan Amendment upon approval by the State Water Board, U.S. EPA, and the Office of Administrative Law.

Table F-5. Salinity Water Quality Criteria/Objectives

Parameter	Agricultural WQ Objective[1]	Secondary MCL[2,3]	U.S. EPA NAWQC
Electrical Conductivity (µmhos/cm)	Varies[2]	900, 1600, 2200	N/A

Parameter	Agricultural WQ Objective[1]	Secondary MCL[2,3]	U.S. EPA NAWQC
Total Dissolved Solids (mg/L)	Varies	500, 1000, 1500	N/A
Sulfate (mg/L)	Varies	250, 500, 600	N/A
Chloride (mg/L)	Varies	250, 500, 600	860 1-hr 230 4-day

1 Narrative chemical constituent objective of the Basin Plan. Procedures for establishing the applicable numeric limitation to implement the narrative objective can be found in the Policy for Application of Water Quality, Chapter IV, Section 8 of the Basin Plan. However, the Basin Plan does not require improvement over naturally occurring background concentrations. In cases where the natural background concentration of a particular constituent exceeds an applicable water quality objective, the natural background concentration will be considered to comply with the objective.

2 The Secondary MCL's are stated as a recommended level, upper level, and a short-term maximum level.

3 The secondary MCL's objectives are specified total dissolved solids or electrical conductivity in addition to sulfate and chloride per the Basin Plan.

(1) **Chloride.** The Secondary MCL for chloride is 250 mg/L, as a recommended level, 500 mg/L as an upper level, and 600 mg/L as a short-term maximum.

(2) **Electrical Conductivity.** The Secondary MCL for electrical conductivity is 900 µmhos/cm as a recommended level, 1600 µmhos/cm as an upper level, and 2200 µmhos/cm as a short-term maximum.

(3) **Sulfate.** The Secondary MCL for sulfate is 250 mg/L as a recommended level, 500 mg/L as an upper level, and 600 mg/L as a short-term maximum.

(4) **Total Dissolved Solids.** The Secondary MCL for total dissolved solids is 500 mg/L as a recommended level, 1000 mg/L as an upper level, and 1500 mg/L as a short-term maximum.

Attachment C includes a screening level for electrical conductivity of 900 µmhos/cm for discharges to water bodies with the MUN use in the Sacramento and San Joaquin River Basins based on the Secondary MCL. The Secondary MCL is derived from human welfare considerations (e.g., taste, odor, laundry staining), not for toxicity. Secondary MCL's are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. To be consistent with how compliance with the standards is determined, the Central Valley Water Board will conduct the RPA for salinity for waters with the MUN use in the Sacramento and San Joaquin River Basins by comparing the maximum observed calendar year annual average effluent electrical conductivity concentration to the screening level. This Order does not include screening levels or effluent limitations for electrical conductivity for waters without the MUN use. If the discharge exceeds the screening level in Attachment C, the Central Valley Water Board will specify a performance-based effluent limitation based on the maximum observed calendar year annual average electrical conductivity of the effluent in the Notice of Applicability. Electrical conductivity is an indicator parameter for salinity, and controlling electrical conductivity should ensure compliance with objectives for other salinity parameters. Therefore, this Order does not include screening levels or effluent limitations for chloride, sulfate, or total dissolved solids.

In order to ensure that all Dischargers will continue to control the discharge of salinity, this Order includes a requirement to implement a Salinity Evaluation and Minimization Plan. Additionally, for discharges that must protect the MUN beneficial use, if any calendar year annual average effluent electrical conductivity concentration exceeds the applicable performance-based trigger, the Discharger will be required to submit and implement an updated Salinity Evaluation and Minimization Plan. This General Order also requires water supply monitoring to evaluate the relative contribution of salinity from the source water to the effluent.

(b) **Dischargers in the Tulare Lake Basin.** The Basin Plan for the Tulare Lake Basin at page IV-10 includes effluent limitations for discharges to navigable waters. The Basin Plan requires at a minimum, discharges to surface waters, including stream channels, to comply with the following effluent limitations:

(1) The maximum effluent electrical conductivity of a discharge shall not exceed the quality of the source water plus 500 µmhos/cm, or 1,000 µmhos/cm, whichever is more stringent.

(2) Dischargers shall not exceed an electrical conductivity of 1,000 µmhos/cm, a chloride content of 175 mg/L, or a boron content of 1.0 mg/L.

This Order includes effluent limitations for electrical conductivity, boron, and chloride based on the effluent limitations specified in the Basin Plan for the Tulare Lake Basin.

xiii. **Settleable Solids.** For inland surface waters, the Basin Plans state that "[w]*ater shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses*." The Central Valley Water Board finds that the discharge of secondary treated wastewater has a reasonable potential to cause or contribute to an excursion above the Basin Plans' narrative objective for settleable solids, which are applicable to discharges from secondary treatment facilities.

xiv. **Temperature.** The Thermal Plan requires that, "*The maximum temperature shall not exceed the natural receiving water temperature by more than 20°F.*" This General Order covers facilities that treat domestic wastewater. Treated domestic wastewater is an elevated temperature waste, which could cause or threaten to cause the receiving water temperature to exceed temperature objectives established in the Thermal Plan. Therefore, reasonable potential exists for temperature and WQBEL's are required for Dischargers in the Sacramento-San Joaquin Delta.

U.S. EPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBEL's are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBEL's for pathogens in all permits for POTW's discharging to contact recreational waters)*." U.S. EPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality*

criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data." (TSD, p. 50)

This General Order covers facilities that treat domestic wastewater, which is an elevated temperature waste. This provides the basis for the discharge to have a reasonable potential to cause or contribute to an excursion above the Thermal Plan requirements. To ensure compliance with the Thermal Plan, an effluent limitation for temperature is included in this General Order for discharges in the Sacramento-San Joaquin Delta.

4. **WQBEL Calculations**

a. This General Order includes WQBEL's for aluminum, ammonia, arsenic, bis (2-ethylhexyl) phthalate, BOD_5, boron, chloride, chlorine residual, chlorodibromomethane, copper, cyanide, diazinon and chlorpyrifos, dichlorobromomethane, electrical conductivity, fluoride, lead, manganese, MBAS, mercury, methylmercury, nitrate plus nitrite, nitrite, pH, settleable solids, temperature, tetrachloroethylene, total coliform organisms, TSS, and zinc. The general methodology for calculating WQBEL's based on the different criteria/objectives is described in subsections V.C.4.b through d, below.

b. **Effluent Concentration Allowance.** For each water quality criterion/objective, the ECA is calculated using the following steady-state mass balance equation from Section 1.4 of the SIP:

$$ECA = C + D(C - B) \text{ where } C>B, \text{ and}$$
$$ECA = C \text{ where } C \leq B$$

where:

ECA = effluent concentration allowance
D = dilution credit
C = the priority pollutant criterion/objective
B = the ambient background concentration.

According to the SIP, the ambient background concentration (B) in the equation above shall be the observed maximum with the exception that an ECA calculated from a priority pollutant criterion/objective that is intended to protect human health from carcinogenic effects shall use the arithmetic mean concentration of the ambient background samples. For ECA's based on MCL's, which implement the Basin Plans' chemical constituents objective and are applied as annual averages, an arithmetic mean is also used for B due to the long-term basis of the criteria.

c. **Basin Plan Objectives and MCL's.** For nitrate plus nitrite and nitrite, the Primary MCL is applied directly as an AMEL and an AWEL is calculated using an AWEL/MDEL multiplier (see Attachment G). For other constituents of concern based on Primary and Secondary MCL's, an AMEL is calculated by multiplying the Secondary MCL by the AMEL multiplier from the SIP and an AWEL is calculated using the MDEL/AMEL multiplier from the SIP (see Attachment G).

d. **Basin Plan Limits.** The Tulare Lake Basin Plan includes effluent limitations for discharges to surface water for boron and chloride. These limitations are included as average monthly limitations in this Order. The statistical procedures included in the SIP and TSD are for calculating WQBELs from water quality objectives/criteria.

Therefore, since the Basin Plan specifies limitations, not objectives, for these constituents it is impracticable to statistically develop other limitations.

e. **Aquatic Toxicity Criteria.** WQBEL's for priority pollutants based on acute and chronic aquatic toxicity criteria are calculated in accordance with Section 1.4 of the SIP. The ECA's are converted to equivalent long-term averages (i.e., LTA_{acute} and $LTA_{chronic}$) using statistical multipliers and the lowest LTA is used to calculate the AMEL and MDEL using additional statistical multipliers. WQBEL's for other constituents of concern based on acute and chronic aquatic toxicity criteria are calculated in accordance with Section 1.4 of the SIP, except that an AWEL is calculated instead of an MDEL using an AWEL multiplier using a 98th percentile occurrence probability.

f. **Human Health Criteria.** WQBEL's for priority pollutants based on human health criteria are also calculated in accordance with Section 1.4 of the SIP. The AMEL is set equal to the ECA and a statistical multiplier was used to calculate the MDEL.

$$AMEL = mult_{AMEL}\left[\min\overbrace{\left(M_A ECA_{acute}, M_C ECA_{chronic}\right)}^{LTA_{acute}}\right]$$

$$MDEL = mult_{MDEL}\left[\min\left(M_A ECA_{acute}, \underbrace{M_C ECA_{chronic}}_{LTA_{chronic}}\right)\right]$$

$$MDEL_{HH} = \left(\frac{mult_{MDEL}}{mult_{AMEL}}\right) AMEL_{HH}$$

where:
$mult_{AMEL}$ = statistical multiplier converting minimum LTA to AMEL
$mult_{MDEL}$ = statistical multiplier converting minimum LTA to MDEL
M_A = statistical multiplier converting acute ECA to LTA_{acute}
M_C = statistical multiplier converting chronic ECA to $LTA_{chronic}$

5. **Whole Effluent Toxicity (WET)**

For compliance with the Basin Plans' narrative toxicity objective, this General Order requires each Discharger to conduct whole effluent toxicity testing for acute toxicity and whole effluent toxicity testing for chronic toxicity, as specified in the Monitoring and Reporting Program (Attachment E, section V). This General Order also contains effluent limitations for acute toxicity and requires the Discharger to implement best management practices (BMP's) to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity.

a. **Acute Aquatic Toxicity.** The Basin Plans contain a narrative toxicity objective that states, "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" (Basin Plan for the Sacramento and San Joaquin River Basins at page III-8.00 and Basin Plan for the Tulare Lake Basin at page III-6). The Basin Plans also state that, "*...effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate...*".

For priority pollutants, the SIP dictates the procedures for conducting the RPA. Acute toxicity is not a priority pollutant. Therefore, the Central Valley Water Board is

not restricted to one particular RPA method. Therefore, due to the site-specific conditions of the potential discharges to be covered under this General Order, the Central Valley Water Board has used professional judgment in determining the appropriate method for conducting the RPA. U.S. EPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBEL's are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBEL's for pathogens in all permits for POTW's discharging to contact recreational waters).*" Acute toxicity effluent limits are required to ensure compliance with the Basin Plans' narrative toxicity objective.

U.S. EPA Region 9 provided guidance for the development of acute toxicity effluent limitations in the absence of numeric water quality objectives for toxicity in its document titled "Guidance for NPDES Permit Issuance", dated February 1994. In section B.2. "Toxicity Requirements" (pgs. 14-15) it states that, "*In the absence of specific numeric water quality objectives for acute and chronic toxicity, the narrative criterion 'no toxics in toxic amounts' applies. Achievement of the narrative criterion, as applied herein, means that ambient waters shall not demonstrate for acute toxicity: 1) less than 90% survival, 50% of the time, based on the monthly median, or 2) less than 70% survival, 10% of the time, based on any monthly median. For chronic toxicity, ambient waters shall not demonstrate a test result of greater than 1 TUc.*" Accordingly, effluent limitations for acute toxicity have been included in this General Order as follows:

Acute Toxicity. Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:

Minimum for any one bioassay	70%
Median for any three consecutive bioassays	90%

b. **Chronic Aquatic Toxicity.** The Basin Plans contain a narrative toxicity objective that state, "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life." (Basin Plan for the Sacramento and San Joaquin River Basins at page III-8.00 and Basin Plan for the Tulare Lake Basin at page III-6.)

No dilution has been granted for the chronic condition in this General Order. Therefore, chronic toxicity testing results exceeding 1.3 chronic toxicity unit (TUc) and exceeding 25% effect demonstrates the discharge has a reasonable potential to cause or contribute to an exceedance of the Basin Plans' narrative toxicity objective, if the cause of toxicity has not been addressed by the time of issuance of the Notice of Applicability.

The Monitoring and Reporting Program of this Order requires chronic WET monitoring for demonstration of compliance with the narrative toxicity objective. In addition to WET monitoring, the Effluent Limitations and Discharge Specifications in section V.A.1.c of the Order includes a monthly median effluent limit (MMEL) and the Special Provisions in section VII.C.2.a of the Order includes requirements for Toxicity Reduction Evaluation (TRE) initiation if toxicity is demonstrated.

To ensure compliance with the Basin Plans' narrative toxicity objective, Dischargers are required to conduct chronic WET testing, as specified in the Monitoring and

Reporting Program (Attachment E, section V). Furthermore, the Special Provision contained at VII.C.2.a of this Order requires Dischargers to investigate the causes of, and identify and implement corrective actions to reduce or eliminate effluent toxicity. If the discharge demonstrates toxicity exceeding the MMEL, the Discharger is required to initiate a TRE in accordance with an approved TRE workplan.

The Central Valley Water Board has observed that several Dischargers have experienced intermittent, low-level chronic toxicity (i.e., TUc ≤ 1.3 and percent effect ≤ 25%). In these instances, Dischargers have conducted costly accelerated monitoring and TRE/TIE evaluations; however, the additional monitoring and evaluations did not identify the cause of the toxicity. This Order allows for Dischargers to conduct a Toxicity Evaluation Study (TES) in lieu of the TRE requirements, either individually or as part of a coordinated group, to determine the cause of the intermittent, low level toxicity, if the MMEL is less than 1.3 TUc and less than 25% effect if approved, or if the discharge has exceeded the MMEL twice or more in the past 12 month period and the cause is not identified and/or addressed.

D. Final Effluent Limitation Considerations

1. Mass-based Effluent Limitations

40 C.F.R section 122.45(f)(1) requires effluent limitations be expressed in terms of mass, with some exceptions, and 40 C.F.R. section 122.45(f)(2) allows pollutants that are limited in terms of mass to additionally be limited in terms of other units of measurement. This Order includes effluent limitations expressed in terms of mass and concentration. In addition, pursuant to the exceptions to mass limitations provided in 40 C.F.R. section 122.45(f)(1), some effluent limitations are not expressed in terms of mass, such as pH and temperature, and when the applicable standards are expressed in terms of concentration (e.g., CTR criteria and MCL's) and mass limitations are not necessary to protect the beneficial uses of the receiving water.

Mass-based effluent limitations have been established in this Order for ammonia, BOD_5, and TSS because they are oxygen demanding substances. Except for the pollutants listed above, mass-based effluent limitations are not included in this Order for pollutant parameters for which effluent limitations are based on water quality objectives and criteria that are concentration-based.

Mass-based effluent limitations shall be calculated and specified in the Notice of Applicability based upon the design average dry weather flow.

2. Averaging Periods for Effluent Limitations

40 C.F.R. section 122.45 (d) requires average weekly and average monthly discharge limitations for POTW's unless impracticable. For priority pollutants, AWEL's have been replaced with MDEL's to be consistent with the SIP. For BOD_5, chlorine residual, pH, and TSS, weekly average effluent limitations have been replaced or supplemented with effluent limitations utilizing shorter averaging periods. The rationale for using shorter averaging periods for these constituents is discussed in section IV.C.3 of this Fact Sheet.

3. Satisfaction of Anti-Backsliding Requirements

The CWA specifies that a revised permit may not include effluent limitations that are less stringent than the previous permit unless a less stringent limitation is justified based on exceptions to the anti-backsliding provisions contained in CWA sections 402(o) or 303(d)(4), or, where applicable, 40 C.F.R. section 122.44(l).

The effluent limitations specified in the Notice of Applicability for an existing Discharger shall be at least as stringent as the effluent limitations in the Discharger's individual NPDES permit, except where the relaxation and removal of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

a. **CWA section 402(o)(1) and 303(d)(4).** CWA section 402(o)(1) prohibits the establishment of less stringent WQBEL's "*except in compliance with Section 303(d)(4).*" CWA section 303(d)(4) has two parts: paragraph (A) which applies to nonattainment waters and paragraph (B) which applies to attainment waters.

   i. For waters where standards are not attained, CWA section 304(d)(4)(A) specifies that any effluent limit based on a TMDL or other WLA may be revised only if the cumulative effect of all such revised effluent limits based on such TMDL's or WLA's will assure the attainment of such water quality standards.

   ii. For attainment waters, CWA section 303(d)(4)(B) specifies that a limitation based on a water quality standard may be relaxed where the action is consistent with the antidegradation policy.

   For the purposes of meeting either of the exceptions above, a receiving water shall be considered an attainment water if the receiving water is not listed as impaired on the 303(d) list for the constituent.[1]

b. **CWA section 402(o)(2).** CWA section 402(o)(2) provides several exceptions to the anti-backsliding regulations. The Notice of Applicability may remove or relax effluent limitations where the removal or relaxation complies with any of these exceptions.

   One of these exceptions, CWA 402(o)(2)(B)(i), allows a renewed, reissued, or modified permit to contain a less stringent effluent limitation for a pollutant if information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance. Updated information that may be used to satisfy this exception include updated effluent and receiving water monitoring data collected subsequent to the adoption date of the individual NPDES permit that indicates that the discharge no longer exhibits reasonable potential to cause or contribute to an exceedance of water quality objectives/criteria, or construction of facility upgrades during the term of the individual NPDES permit that altered the character of the wastewater with regard to the pollutant (e.g., removal of effluent limitations for chlorine residual for a facility that converted from chlorine disinfection to UV disinfection during the permit term).

4. **Antidegradation Policies**

This Order specifies that effluent flow limitations specified in the Notice of Applicability shall not exceed the permitted flow rates in a Discharger's individual NPDES permit in the absence of an approved antidegradation analysis. For Dischargers not requesting an increase in flow, this General Order will not allow for an increase in flow or mass of pollutants to the receiving water. Therefore, a complete antidegradation analysis is not necessary where no increase in flow is requested. The Order requires compliance with applicable federal technology-based standards and with WQBEL's where the discharge could have the reasonable potential to cause or contribute to an exceedance of water quality standards. The permitted discharge is consistent with the antidegradation

[1] "The exceptions in Section 303(d)(4) address both waters in attainment with water quality standards and those not in attainment, i.e. waters on the section 303(d) impaired waters list." State Water Board Order WQ 2008-0006, Berry Petroleum Company, Poso Creek/McVan Facility.

provisions of 40 C.F.R. section 131.12 and State Water Board Resolution No. 68-16. Compliance with these requirements will result in the use of best practicable treatment or control of the discharge. The impact on existing water quality will be insignificant.

For new Dischargers and existing Dischargers requesting an increase in flow from those specified in their individual NPDES permit, the Notice of Intent (Attachment B) requires an antidegradation analysis meeting the requirements of 40 C.F.R. 131.12 and State Water Board Resolution No. 68-16, "Statement of Policy With Respect to Maintaining High Quality of Waters in California". See Administrative Procedures Update (APU) 90-004 for additional guidance. A Notice of Applicability will not be issued to a Discharger if the discharge is not consistent with antidegradation requirements.

This General Order allows for the removal or relaxation of existing effluent limitations for constituents in which updated monitoring data demonstrate that the effluent does not cause or contribute to an exceedance of the applicable water quality criteria or objectives in the receiving water. The Central Valley Water Board finds that the removal or relaxation of the effluent limitations will not result in an allowed increase in pollutants or any additional degradation of the receiving water. Thus, the removal or relaxation of effluent limitations is consistent with the antidegradation provisions of 40 C.F.R. section 131.12 and State Water Board Resolution No. 68-16.

E. Interim Effluent Limitations

The State Water Board's Resolution 2008-0025 "Policy for Compliance Schedules in National Pollutant Discharge Elimination System Permits" (Compliance Schedule Policy) requires the Central Valley Water Board to establish interim numeric effluent limitations in this Order for compliance schedules longer than 1 year. As discussed in section VII.B.7 of this Fact Sheet, the Central Valley Water Board is approving compliance schedules longer than 1 year for methylmercury. The Compliance Schedule Policy requires that interim effluent limitations must be based on current treatment plant performance or existing permit limitations, whichever is more stringent.

The interim effluent limitations for methylmercury are based on Facility performance and have been retained from the individual NPDES permits for the applicable Dischargers.

1. **Interim Limits for Total Mercury.** The Compliance Schedule Policy requires the Central Valley Water Board to establish interim requirements and dates for their achievement in the NPDES permit. Interim numeric effluent limitations are required for compliance schedules longer than 1 year. Interim effluent limitations must be based on current treatment plant performance or previous final permit limitations, whichever is more stringent. When feasible, interim limitations must correspond with final permit effluent limitations with respect to averaging bases (e.g., AMEL, MDEL, average monthly, etc.) for effluent limitations for which compliance protection is intended.

   For mercury, the Delta Mercury Control Program requires POTW's to limit their discharges of inorganic (total) mercury to Facility performance-based levels during Phase 1. The interim inorganic (total) mercury effluent mass limit is to be derived using current, representative data and shall not exceed the 99.9th percentile of the 12-month running effluent inorganic (total) mercury mass loads. At the end of Phase 1, the interim inorganic (total) mercury mass limit will be re-evaluated and modified as appropriate. The Delta Mercury Control Program also requires interim limits established during Phase 1 and allocations will not be reduced as a result of early actions that result in reduced inorganic (total) mercury and/or methylmercury in discharges. The interim effluent limitations for total mercury are based on Facility performance and have been retained from the existing individual NPDES permits.

The Central Valley Water Board finds that the Dischargers listed in table below can undertake source control and treatment plant measures to maintain compliance with the interim limitations included in this General Order. Interim limitations are established when compliance with final effluent limitations cannot be achieved by the existing discharge. Discharge of constituents in concentrations in excess of the final effluent limitations, but in compliance with the interim effluent limitations, can significantly degrade water quality and adversely affect the beneficial uses of the receiving stream on a long-term basis. The interim limitations, however, establish an enforceable ceiling concentration until compliance with the effluent limitation can be achieved.

The following table summarizes the interim effluent limitations for total mercury:

Table F-6. Interim Effluent Limitations for Total Mercury

Discharger	Individual Order / NPDES No.	Interim Limitation (grams/year)
City of Lodi, White Slough Water Pollution Control Facility	R5-2013-0125-01 / CA0079243	23
City of Manteca and Dutra Farms, Inc., Wastewater Quality Control Facility	R5-2015-0026 / CA0081558	90

F. Land Discharge Specifications

This General Order does not authorize site specific discharges to land; however, this General Order does authorize the use of unlined ponds (e.g., treatment ponds, emergency storage, equalization, polishing) as part of the treatment system for which the specifcations are provided in section VII.C.4.c, Pond Operating Specifications, of this General Order. For Dischargers enrolled under this General Order that discharge to land by means other than lined or unlined ponds that are part of the treatment system, or to ponds that are part of the treatment system but are otherwise regulated under separate WDR's, site-specific discharges to land will be regulated through a separate WDRs.

G. Recycling Specifications

This General Order does not authorize the production or use of recycled water. For Dischargers enrolled under this General Order that also produce and/or use recycled water, the production and/or use of recycled water will be regulated through separate WDR's, the General Order for Water Recycling Requirements (WQ 2016-0068-DDW), or another applicable water recycling order.

VI. RATIONALE FOR RECEIVING WATER LIMITATIONS

Basin Plan water quality objectives to protect the beneficial uses of surface water and groundwater include numeric objectives and narrative objectives, including objectives for chemical constituents, toxicity, and tastes and odors. The toxicity objective requires that surface water and groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, animals, or aquatic life. The chemical constituent objective requires that surface water and groundwater shall not contain chemical constituents in concentrations that adversely affect any beneficial use or that exceed the MCLs in Title 22, CCR. The tastes and odors objective states that surface water and groundwater shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses. The Basin Plan requires the application of the most stringent objective necessary to ensure that surface water and groundwater do not contain chemical constituents, toxic substances,